**Planning & Community Development**

# Small Impact Project
# Technical Guidance Pamphlet
# 2012

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The Municipal Code (Title 15 Buildings and Construction) can be reviewed at mrsc.org

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## PRELIMINARY DRAINAGE ASSESSMENT

By answering the questions on the following table, you can determine what level of drainage design your project triggers. If your project has small or medium impacts, refer to the appropriate pamphlet for further information.

A Small Impact Project triggers Minimum Requirement #2 of the 2005 Department of Ecology (DOE) *Stormwater Management Manual for Western Washington*. Minimum Requirement #2 is a Stormwater Pollution Prevention Plan, which is often referred to as an erosion prevention and sediment control plan.

A Medium Impact Project triggers Minimum Requirements #1 through #5 of the 2005 Department of Ecology (DOE) *Stormwater Management Manual for Western Washington*. Minimum requirements #1 through #5 are:

1. Prepare stormwater site plans
2. Construct stormwater pollution prevention (erosion prevention)
3. Control pollutant sources
4. Preserve natural drainage systems and outfalls
5. Manage stormwater onsite

Projects that are not Small Impact or Medium Impact are Large Impact projects. These projects require engineering design according to the 2005 Department of Ecology (DOE) *Stormwater Management Manual for Western Washington*.

The City prepared two pamphlets that contain drainage best management practices for Small Impact and Medium Impact projects.

| Situation #1 | Yes | No |
|---|---|---|
| 1. Does the property have less than 35% existing impervious surface?<br>If "NO", then go to Situation #2.<br>If "YES", then go to question #1A. | | |
| 1A. Does the project involve 2000 square feet or more of new, replaced, or new plus replaced impervious surface?<br>If "NO", go to question 1B.<br>If "YES", then refer to the Medium Impact Project pamphlet | | |
| 1B. Does the project disturb 7000 square feet or more of land?<br>If "NO", then the project is a Small Impact Project.<br>If "YES", then refer to the Medium Impact Project pamphlet. | | |
| Situation #2 | | |
| 2. Does the property have 35% or more existing impervious surface?<br>If "NO", then go to question #1.<br>If "YES", then go to question #2A. | | |
| 2A. Does the project involve 2000 square feet of new, replaced, or new plus replaced impervious surface?<br>OR<br>Does the project disturb 7000 square feet or more of land?<br>If "NO" to both, then the project is a Small Impact Project.<br>If "YES" to either, then refer to the Medium Impact Project pamphlet. | | |

**ACRONYMS AND DEFINITIONS**

| | |
|---|---|
| BMP | Best Management Practice |
| DOE | Department of Ecology |
| LID | Low Impact Development |
| SWPPP | Stormwater Pollution Prevention Plan |
| V:H | Vertical to Horizontal |

The following two terms apply to very similar site conditions. The important difference between the two terms is that one term (impervious) applies to surface water/drainage and the other term (hardscape) applies to lot coverage in the zoning code.

Impervious – is a surface water term. An impervious surface is a hard surface area which either prevents or retards the entry of water into the soil mantle as under natural conditions prior to development. A hard surface area which causes water to run off the surface in greater quantities or at an increase rate of flow from the flow present under natural conditions prior to development. Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled, macadam or other surfaces which similarly impede the natural infiltration of stormwater.

Hardscape – is a zoning-related term. The Development Code defines Hardscape as: Any structure or other covering on or above the ground that includes materials commonly used in building construction such as wood, asphalt and concrete, and also includes, but is not limited to, all structures, decks and patios, paving including gravel, pervious or impervious concrete and asphalt. The most common residential zone, R-6, restricts hardscape on lots to 50% of the lot.

## INTRODUCTION

On May 1st, 2009, the City of Shoreline implemented new surface water code that requires Low Impact Development (LID) for projects that disturb soils or add, replace, or create impervious surfaces. An impervious surface is a surface that can not be penetrated easily. Examples are pavement, patios, roofs, and plastic-covered soils.

LID emphasizes conservation and integration of on-site natural features during development. Careful consideration of existing features on and near a site and incorporation of LID best management practices can significantly lower stormwater requirements for a project.

This pamphlet applies to one single family residential project on one site.

### Why Drainage Requirements?

Increased runoff can cause erosion, increase scour in streams and drainage channels, and contribute to slope failures. Increased runoff collects pollutants and carries them to streams, lakes, wetlands, and Puget Sound.

Nearly all improvements on a site increase the storm water runoff by decreasing the amount of rainwater and snow melt that can soak into the ground. Such improvements include:

1. Removing trees and other vegetation
2. Grading
3. Installing roofs, pavements, and similar hard surfaces
4. Installing lawn and topsoil
5. Driving over the ground
6. Placing plastic in landscaping areas

### Does my project need a permit?

If your project triggers Minimum Requirement #2 Stormwater Pollution Prevention Plan (SWPPP), then you need a permit. The City reviews and approves *Small Impact Drainage Plans* through a building permit or through a separate site development permit.

### Do I need to hire an engineer?

*Small Impact Drainage Plan* requirements for one single family residential lot can usually be met with plans prepared by the property owner, contactor, or architect, except:

1. Projects that disturb one-quarter acre or more of soil require an SWPPP prepared by a civil engineer licensed in the State of Washington.
2. Projects within 100’ of critical areas such as floodplains, streams, wetlands, shorelines, or geologically hazardous areas, require an SWPPP prepared by a civil engineer licensed in the State of Washington.

**Submittals**

If your project triggers a *Small Impact Drainage Plan* review, you will submit the following items to the Permit Services Center in Planning and Development Services.

1. Complete Permit Application.
2. **Written Drainage Assessment**. A copy of the form is attached.
3. **Stormwater Pollution Prevention Plan**: A scale drawing of the individual site showing how problems of erosion and sedimentation will be prevented. A sample plan is attached.

**Implementation**

The BMPs located downstream of areas that will be disturbed must be installed and operating before disturbance occurs. Disturbance includes demolition, vegetation removal, grading, etc.

Implementation of the drainage plan must be consistent with the approved plan and the installation guidelines in this pamphlet. The size and placement of the best management practices on the approved permit plans may require adjustment during installation in order to ensure the BMPs will work as intended.

**Inspection**

On many small impact projects separate inspection of the SWPPP is not required. Depending on site conditions, inspection of the best management practices may be required before any ground disturbance occurs. Under certain circumstances a pre-construction inspection/meeting is necessary. Your permit will indicate which inspections are required.

Additional measures may be required by the City of Shoreline if erosion and sediment controls are insufficient or fail to contain sediment on the project site.

**Operation and Maintenance Responsibility**

The Permitee/property owner:

1. Maintains all best management practices in good working order, so that the practices perform as intended.
2. Verifies the correct locations of utilities to avoid damage or disturbance.
3. Keeps off-site streets clean at all times using sweepers. Flushing streets is not allowed.

## BEST MANAGEMENT PRACTICES (BMPs)

This section presents specifications for erosion and sediment control BMPs appropriate for Small Impact Projects. The City may required additional BMPs or other measures to help prevent erosion and to keep sediment onsite. In all cases the SWPPP must meet the requirements of Volume II of the Stormwater Management Manual for Western Washington.

Certain restrictions are in place that attempt to protect waterways, soils, and critical areas.

### Seasonal Restrictions

From October 1st through April 30th

1. No soils can be left open for more than two consecutive working days. Apply mulch or other cover measure to these soils.
2. Stabilize exposed soils at the end of the last working day before a weekend, holiday, or predicted rain event.

### Critical Area Restrictions

1. Schedule work from May 1st through September 29th, whenever possible. Avoid work November through February.
2. Delineate all critical area buffers before any ground disturbance occurs. Critical areas include shorelines, lakes, streams, wetlands, and steep slopes.
3. Install silt fences or berms on buffers that will be downstream of disturbed areas.

Additional information on small site SWPPP practices is included as BMP C180 in the Stormwater Management Manual for Western Washington, Volume II, Construction Stormwater Pollution Prevention, February 2005, Department of Ecology Publication No. 05-10-30. This is available online at:

http://www.ecy.wa.gov/programs/wq/stormwater/manual.html

Reference copies of the manuals are also available at Planning and Development Services - Permit Services Center.

### Site Planning

The following are tips for creating a development that minimizes the impact your construction project will have on the patterns of water flow and vegetated areas of the site and help facilitate stormwater infiltration on the property:

1. Place structures as close to the public access point as possible to minimize road/driveway length. Minimize paved parking areas, and utilize porous paving options wherever possible.
2. Slope paved areas toward stormwater management areas.
3. Reduce building footprints whenever possible. Utilize basements or taller structures with lofts or second stories to achieve square footage goals.
4. Orient buildings on slopes with long-axis along topographic contours to reduce grading requirements.
5. Set clearing limits that give maximum protection to soils and vegetation while allowing reasonable areas for equipment to maneuver on the site. Delineate the areas on the construction plans. Before any work begins onsite, delineate the limits using sturdy temporary fencing or taping.

**Limit Site Disturbance**

The BMPs in this section protect vegetation and soil. Soil compaction is a leading cause of death or decline of mature trees in developed areas. Most tree roots are located within 3' of the ground surface and the majority of the fine roots necessary for water and nutrient absorption are within 18". Roots can extend 2 to 3 times beyond the diameter of the crown.

Leaving native vegetation intact is the single most effective method for reducing erosion on the construction site. Well marked clearing limits prevent disturbance to vegetation and soils in critical areas, buffers, and protected conservation and lost perimeter zones.

In addition to soil compaction, several other direct and indirect impacts can influence vegetation health during land development including:

1. Direct loss of roots from trenching, foundation construction, and other grade changes.
2. Application of fill material.
3. Damage to trunks or branches from construction equipment and activities.
4. Exposure of forest interior areas to new stresses of forest edges as land is cleared.
5. Changes in surface and subsurface water flow patterns.
6. Vegetation protection.

**Protect Vegetation**

1. Map native soil and vegetation retention areas on all plans to protect soils and vegetation from construction damage.
2. Clearing limits must be well marked with highly visible fencing or wire and tape and should be at least 3' high.
3. Fencing for vegetation retention areas should be located at a minimum of 3' beyond the existing tree canopy along the outer edge of the tree stand.
4. Individual trees that are to be preserved should be marked and the areas within the drip line protected from disturbance.
5. Equipment operators should be informed of clearing limits prior to commencement of grading work. Walk property with equipment operators to clarify construction boundaries and limits of disturbance.
6. Prohibit the stockpiling or disposal of excavated or construction materials in the vegetation retention areas to prevent contaminants from damaging vegetation and soils.
7. Avoid excavation or changing the grade near trees that have been designated for protection.

**Conserve and Protect Topsoil**

Stockpiling topsoil for reuse during final site stabilization saves money by reducing the amount of soil to be imported and exported.

1. Stockpile soil removed during grading.
2. Cover stockpiled soil with mulch (preferred), plastic sheeting or temporary grass seeding (for stockpiles that may remain for several months) to prevent erosion.
3. Surround stockpiles with silt fence.

**Control Sediment and Flows On-Site**

Most often some soil on a construction site will be mobilized by wind and water. BMPs such as a stabilized entrance, silt fencing and sediment taps can capture and contain soil on site, reducing the amount of sediment and associated pollutants which can enter nearby stormwater systems, waterways and wetlands.

**Construction Entrance**

Vehicles and heavy equipment can track mud offsite where it washes off the roads into ditches and waterways. A stabilized construction entrance is a stone pad located at the vehicular access point to the site that minimizes the amount of sediment and mud tracked offsite by construction site traffic.

1. Stabilized entrance should use 4" to 8" angular quarry spalls.
2. Dimensions should be 75' minimum length, 15' minimum width, 1' dept.
3. If site soils are clayey, filter fabric should be placed under the stone pad to prevent soil form working into the rock material.
4. Install driveway culvert if roadside ditch is present.
5. Crown the entrance so runoff does not drain onto roadway.
6. Limit site access to one route.
7. Install fencing as necessary to restrict traffic to stabilize entrance.
8. Remove any mud or gravel that is tracked onto roadway by sweeping or shoveling it back onto site.

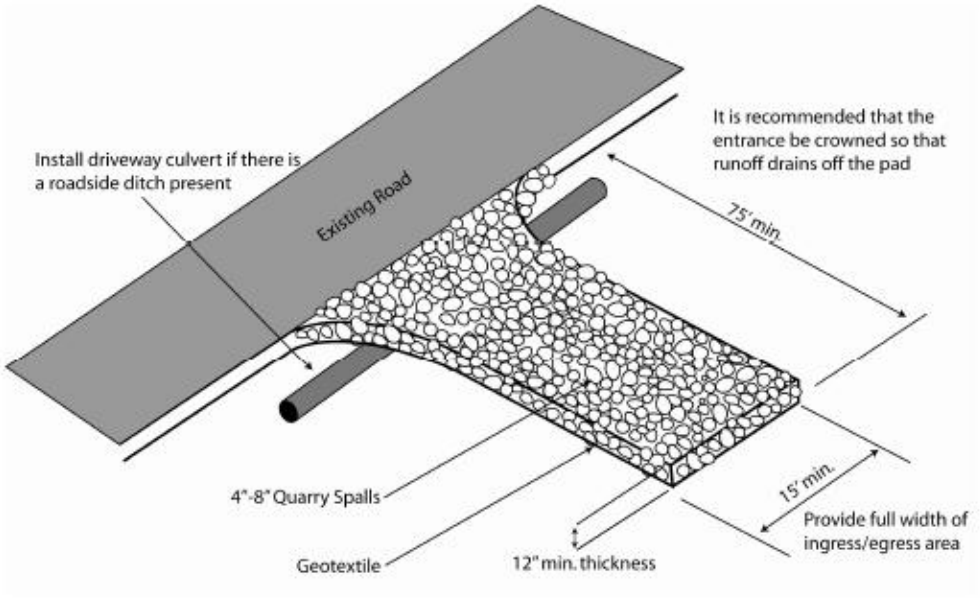


**Figure 1 Stabilized Construction Entrance**

**Silt Fence**

Silt Fencing, also known as filter fencing, is a temporary physical barrier to intercept sediment that has been mobilized on site. Silt Fences are usually placed around the perimeter of a construction site, and can be used for both retaining sediment and demarking clearing limits on the site.

1. Follow manufacturer's instructions on proper installation of filter fabric.
2. The fabric at the bottom of a silt fence must be firmly anchored into the soil by burying it in a "J" configuration in a trench that is backfilled. See Figure 2.
3. A wire mesh fence can be placed behind a silt fence to prevent collapse where soil may pile up against the silt fence.
4. Choose filter fabric with proper porosity and ability to trap sediments for the soil type on site.
5. Do not install across streams or ditches.
6. Do not attach to existing trees.
7. Construct trench to follow natural contour of land to ensure best protection.
8. Inspect fencing on a regular basis throughout construction.

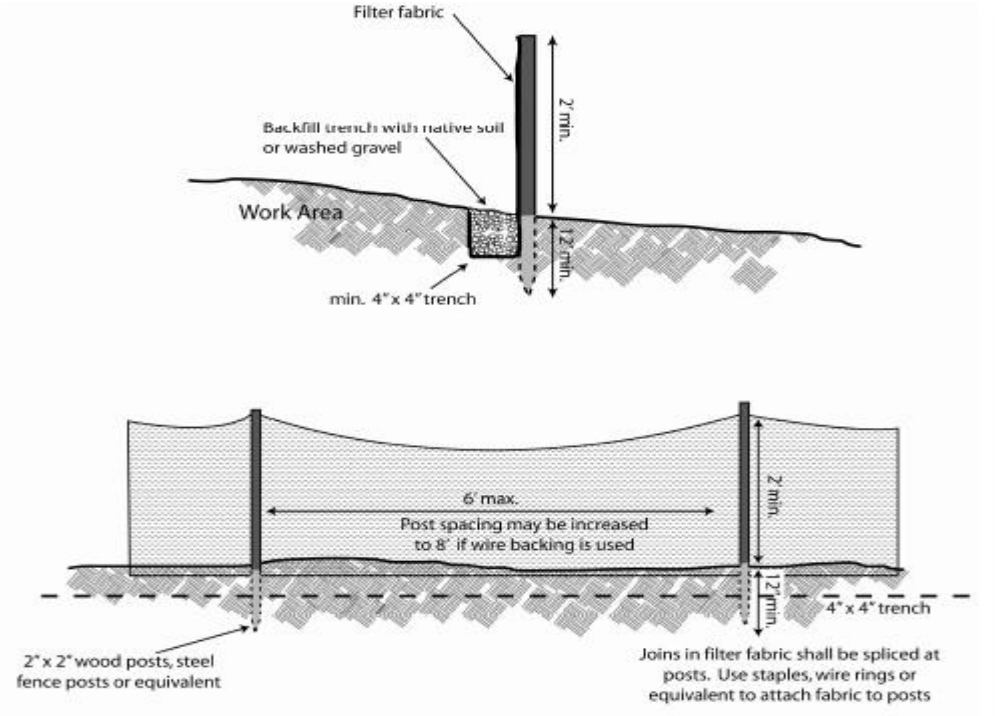


**Figure 2 Silt Fence Diagram**

***Sediment Barriers***

Sediment barriers are used to impede the flow of water in small channels and ditches and allow sediment to settle out. Barriers are the last defense against sediment leaving a site and should be implemented as a secondary measure. Barriers may be constructed of sand or gravel bags, gravel or rock berms, manufactured silt dikes, straw bales, or brush waddles. In order to function, the barrier must be dense and allow water to back up behind it and flow across a low spot near the center of the barrier.

1. A check dam is an example of an effective barrier.
2. A check dam is a small rock dam constructed across a path of water that slows concentrated flows and filters sediments.

Kitsap County

a. Dam should be constructed of rock or pea-gravel filled sandbags.

b. Dam should be placed perpendicular to flow of water.

c. The maximum spacing between the dams shall be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.

d. Construct so that center of the dam is at leas 12” lower than the out edges.

e. Side slopes should be 2:1 or less.

f. Maximum height should be 2’ at center of dam.

g. Whatever material is used, dam should form a triangle when viewed from side.

h. Line area under check dam with filter fabric.

i. Seed and mulch area beneath check dam immediately after removal.

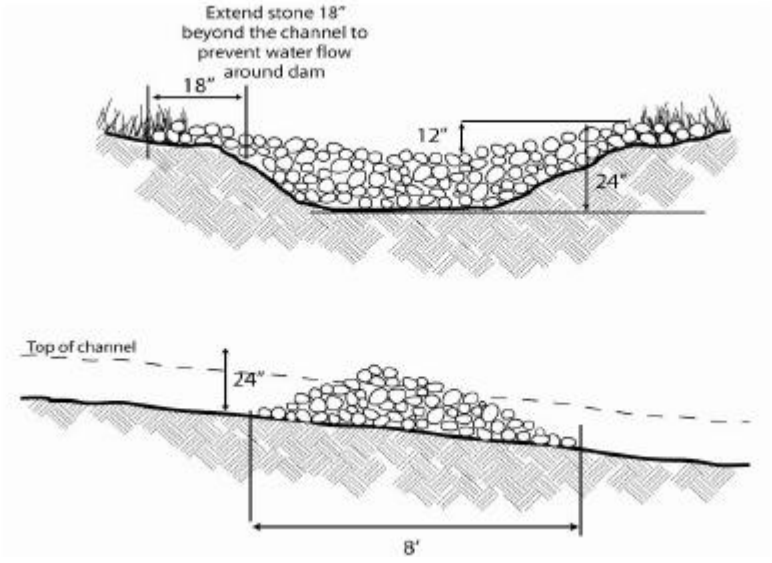


**Figure 3 Check Dam Sections**

***Stabilize Soils***

Covering disturbed areas with mulch, woven materials, plastic sheeting or temporary seeding prevents soil erosion on disturbed areas and soil stockpiles. If the final stabilization of the site will not occur for more than 30 days, additional measures may be needed to protect the site soil.

*Mulching*

Mulching provides immediate temporary protection from erosion. Common much materials include straw, compost, and wood chips. Mulch is a temporary measure that should be followed up by seeding or other permanent landscape implementation. Mulch may be covered with a loose weave net to protect it form wind and water exposure.

**Table 2 Mulch Application Rates**

| Type of Mulch | Thickness of Application |
|---|---|
| Straw | 2" – 3" thick; 5 bales per 1000 square feet |
| Hydromulch | 25 – 30 pounds per 1000 square feet |
| Composted mulch and compost | 2" minimum |
| Chipped on-site vegetation | 2" minimum |
| Wood-based mulch | 2" minimum |

*Temporary Seeding*

Seeding is intended to reduce erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion. Seeding can be temporary or permanent. Seeding may be used throughout the project on disturbed areas that have reached final grade or that will remain unworked for more than 30 days.

1. Install all surface runoff control measures before seeding.
2. Mulch is required at all times because it protects seeds from heat, moisture loss, and transport due to runoff.
3. All disturbed areas must be reviewed in late August to early September and all seeding should be completed by the end of September. Otherwise, vegetation will not establish itself enough to provide adequate winter cover.
4. The optimum seeding windows for Western Washington are April 1$^{st}$ through May 31$^{st}$ and September 1$^{st}$ through October 1$^{st}$.

**Table 3 Temporary Control Seed Mix**

| Grass Type | % by Weight |
|---|---|
| Chewings fescue Festuca ruba var. commutate | 40 |
| Perennial rye – *Lolium perenne* | 50 |
| Redtop or colonial bentgrass – *Agrostis alba* or *Agrostis tenuis* | 5 |
| White Dutch clover – *Trifolium repens* | 5 |

| |
|---|
| Application rate of erosion control seed mix is 120 pounds per acre. |

*Final Seeding*

1. The best **time to seed** is April 1st through June 30th, and September 1st through October 15th. Areas may be seeded between July 1st and August 31st, but irrigation may be required in order to grow adequate cover. If seeding during the wet seasons, mulch is required.
2. The seedbed should be firm but not compacted because soils that are well compacted will not vegetate as quickly or thoroughly.
3. Slopes steeper than 3H:1V shall be surface roughened and mulched.
4. Mulch may be applied on top of the seed.
5. Apply at a rate of 120 pounds per acre. This rate may be reduced if soil amendments or slow-release fertilizers are used. Local suppliers should be consulted for their recommendations because the appropriate mix depends on a variety of factors, including exposure, soil type, slope, and expected foot traffic.

**Table 4 Landscaping Seed Mix**

| Grass Type | % Weight/% Purity/%Germination |
|---|---|
| Perennial rye blend *Lolium perenne* | 70/98/90 |
| Chewings and red fescue blend *Festuca rubra var. commutate* or *Festuca rubra* | 30/98/90 |

**Table 5 Low- Growing Turf Seed Mix**

| Grass Type | % Weight/% Purity/%Germination |
|---|---|
| Dwarf tall fescue (several varieties) *Festuca arundiacea var.* | 45/98/90 |
| Dwarf perennial rye (Barclay) *Lolium perenne var. Barclay* | 30/98/90 |
| Red fescue *Festuca rubra* | 20/98/90 |
| Colonial bentgrass *Agrostis tenuis* | 5/98/90 |
| ***Good for dry situations and requires little maintenance. | |

*Sodding*

Sodding may be used in the following areas:

1. Disturbed areas that require short-term or long-term cover.
2. Disturbed areas that require immediate vegetative cover.

**Design and Installation Specifications**

Sod shall be free of weeds, of uniform thickness (approximately 1" think), and shall have a dense root mat for mechanical strength.

The following steps are recommended for sod installation:

1. Shape and smooth the surface to final grade in accordance with the approved grading plan.
2. Amend 2" (minimum) of well-rotted compost into the top 6" of the soil if the organic content of the soil is less then 10%. Compost used should meet Ecology publication 98-38 specifications for Grade A quality compost.
3. Fertilize according to the supplier's recommendations. Disturbed areas within 200' of water bodies and wetlands must use non-phosphorus fertilizer.
4. Work lime and fertilizer 1" to 2" into the soil, and smooth the surface.
5. Lay strips of sod beginning at the lowest area to be sodded and perpendicular to the direction of water flow. Wedge strips securely into place. Square the ends of each strip to provide for a close, tight fit. Stagger joints at least 12". Staple on the slopes steeper than 3H:1V.
6. Roll the sodded area and irrigate.
7. When sodding is carried out in alternating strips or other patterns, seed the areas between the sod immediately after sodding.

**Maintenance Standards**

If the grass is unhealthy, determine cause and take action to reestablish. If it is impossible to establish a healthy groundcover due to frequent saturation, instability, or some other cause, remove the sod and seed the area with an appropriate seed mix. Protect with a net or blanket.

CITY OF SHORELINE

**Planning and Development Services**

# Surface Water Summary Form – Small Impact Project

| | |
|---|---|
| Project Address: | Date: |
| Contact / Prepared By: | Phone: |
| Mailing Address: | |
| Project Description: | |
| Impervious – Existing (square feet) | |
| Impervious – Proposed Total (square feet) | |
| Impervious – Proposed New (square feet) | |
| Impervious – Proposed Replaced (square feet) | |
| Land Disturbance – Proposed (square feet) | |
| Cut – (cubic yards) | |
| Fill – (cubic yards) | |
| Native Vegetation – Proposed Retention (square feet) | |
| Site Area (square feet) | |
| Critical Area or Special Drainage Area onsite or abutting: (circle )<br>Landslide Seismic Wetland Flood Stream Shoreline Erosion Hazard None | |
| Flattest slope on site (Vertical:Horizontal) - | |
| Steepest slope on site (Vertical:Horizontal) - | |
| Property Description: (natural features and area, slopes (V:H), trees/shrubbery/grass areas, etc.) | |
| Existing Structures and Improvements: (buildings, driveways, patios, sidewalks etc. and areas in square feet or acres) | |